

APPENDIX A

2008/2009 Long Beach Stormwater Quality Assurance/Quality Control

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2008/2009 Long Beach Stormwater Quality Assurance/Quality Control Report

1.0 INTRODUCTION

Kinnetic Laboratories conducts its activities in accordance with formal QA/QC procedures. The objectives of the QA/QC Program were to fully document the field and laboratory data collected, to maintain data integrity from the time of field collection to storage at the end of the project, and to produce the highest quality data possible. The program was designed to allow the data to be assessed by the following parameters: Precision, Accuracy, Comparability, Representativeness, and Completeness. These parameters were controlled by adhering to documented methods and procedures (SOPs), and by the analysis of quality control (QC) samples on a routine basis.

Field Quality Control included the analysis of duplicate samples, adherence to SOPs and formal sample documentation and tracking. Analytical chemistry QC was formalized by EPA and State certification agencies, and involved internal QC checks such as method blanks, matrix spike/spike duplicates (MS/MSDs), laboratory control spike/laboratory control spike duplicates (LCS/LCSDs), laboratory replicates and calibration standards. Standard Reference Materials (SRMs) or Certified Reference Materials (CRM) were also run along with calibration standards for each batch of samples.

All analytical data collected for this sediment-testing program underwent QA/QC evaluation according to EPA National Functional Guidelines for inorganic and organic data review (USEPA, 2001; 2002). Project specific QA/QC objectives are detailed in Tables D-1 through D-3. The laboratory adopted somewhat different objectives based upon changes in the laboratory control charts which were considered throughout the evaluation process.

2.0 QA/QC METHODS

The overall quality of the dataset was determined to a large degree by the thoroughness, accuracy and precision of the laboratory QC records that explains why the majority of this section is devoted to examining them in detail. The QC is discussed individually by topic.

2.1 Precision

Precision provides an assessment of mutual agreement between repeated measurements. These measures may apply to blind field duplicates (FD), laboratory duplicates (DUP), matrix spike duplicates (MSD), laboratory control spike duplicates (LCS) and laboratory control sample duplicates (LCSD). Monitoring of precision through the process allows for the evaluation of the consistency of field sampling and laboratory analysis.

The Relative Percent Difference (RPD) is used to evaluate duplicate samples. The RPD is the difference between the two samples divided by their average expressed as percent and is calculated as:

$$RPD = 100 * \left(\frac{|x_1 - x_2|}{\frac{1}{2}(x_1 + x_2)} \right)$$

where:
 x_1 = Concentration of sample 1
 x_2 = Concentration of sample 2

RPDs can be large when analyzing differences between small numbers, a situation that is common when analyzing DUPs with values near the reporting limit. When one or both concentrations are less than five times the reporting limit, replication is assessed by determining if the two values differ by more than 1 times the reporting limit. When one or both values are less than the reporting limit, then precision cannot be ascertained.

2.2 Accuracy

An assessment of the accuracy of measurements is based on determining the difference between measured values and the known or “true” value and is applied to MS/MSDs, LCS/LCSDs, BS/BSDs and CRMs.

In general, Percent Recovery is calculated as:

$$\% R = 100 * \left(\frac{\text{Measured Value}}{\text{True Value}} \right)$$

Matrix Spike recoveries take into account the concentration of the source sample:

$$\% R_{MS} = 100 * \left(\frac{\text{Measured Value} - \text{Sample Value}}{\text{True Value}} \right)$$

2.3 Representativeness, Comparability and Completeness

Representativeness is the degree to which data accurately and precisely represents the natural environment.

Comparability is the measure of confidence with which one dataset can be compared to another. The use of standardized methods of chemical analysis and field sampling and processing are ways of assuring comparability. The implementation of thorough QA/QC methods such as laboratory QC is essential.

Completeness is a measure of the percentage of the data judged valid after comparison with specific validation criteria. This includes data lost through accidental breakage of sample containers or other activities that result in irreparable loss of samples. Implementation of standardized Chain-of-Custody procedures which track samples as they are transferred between custodians is one method of maintaining a high level of completeness

A high level of completeness is essential to all phases of this study due to the limited number of samples. Of course, the overall goal is to obtain completeness of 100 percent. However, a realistic data quality objective of 95% will insure an adequate level of data return.

Close adherence to ‘Standard Operating Procedures’ (SOPs) assures that the resulting data is representative, complete and comparable. The results are further assessed with a thorough validation process.

2.4 Data Qualifier Codes

Where appropriate, data qualifiers were associated with the results using the following standard notations from the EPA guidance documents:

<u>Data Review Qualifiers</u>	
U	Not detected The compound was analyzed for but was not detected above analytical reporting limits. The associated value is the sample reporting limit
UJ	Estimated Detection Limit The compound was analyzed for but was not detected. The associated value is an estimate and may be inaccurate or imprecise
J-	Estimated Value The associated value is a low estimate
J	Estimated Value The associated value is an estimated quantity
J+	Estimated Value The associated value is a high estimate
R	Rejected The data are unusable. The analyte may or may not be present

The EPA guidance documents are clear that data review and qualification rules are to be tempered using professional judgment. The specific data qualifications as they apply to this project are discussed in the following section.

3.0 QA/QC RESULTS

The project generated 2,840 sample results not including calculated values such as Total DDT, total PCBs, etc. and another 5,262 QC records. Counts of the QC-types are summarized in Table A-1. Generally the results were well within the appropriate ranges and limits and any significant exceptions and any resulting data qualifications are presented and discussed in detail in this section.

The final qualifiers, assigned as the result of a review of each the laboratory QC records, affected only 19 out of the 2,840 sample results in the archive, which translates to 0.7% of the total. All qualified data were still of use in the final evaluations. None required rejection. Data requiring qualification and the resulting qualifiers are summarized in Table A-2.

Table A-1. Count of QC Types.

Analyte	BLK	BS	DUP	MS	Positive Control	SRM	Total
Conventionals	112	-	106	104	-	92	414
Dissolved Metals	106	-	55	110	-	55	326
Total Metals	192	-	111	222	-	101	626
Bacteria	15	-	-	-	15	-	30
Aroclors	35	-	35	-	-	-	70
PCB Congeners	270	540	270	540	-	-	1620
Chlorinated Pesticides	155	306	155	306	-	-	922
Organophosphates	119	236	119	236	-	-	710
Triazine	60	120	60	120	-	-	360
Totals	1064	1202	911	1638	15	248	5078

TableA-2. Summary of Qualifiers.

Analyte	Batch	# Samp. QUALs	Final QUAL	BLK	DUP	BS	MS	SURR	CRM	HOLD	FIELD
<i>Bacteria</i>											
Fecal Coliform	0206	4	J	-	-	-	-	-	-	-	J
Total Coliform	0702	1	J	-	-	-	-	-	-	-	J
Total Coliform	1126	2	J	-	-	-	-	-	-	-	J
<i>Dissolved Metals</i>											
Nickel	PL80301	4	J	-	-	-	-	-	-	-	J
<i>Chlorinated Pesticides</i>											
Toxaphene	44007	4	J	-	J	-	-	-	-	-	
<i>Organophosphates</i>											
Dichlorvos	43033	1	J+	-	-	-	J+	-	-	-	-
Fenthion	38137	1	J-	-	-	-	J-	-	-	-	-
Malathion	43033	2	-	-	-	-	J+	-	-	-	-
Malathion	44007	4	-	-	-	-	J+	-	-	-	-
<i>Triazine</i>											
Simazine	44007	1	-	-	-	-	J+	-	-	-	-
Totals		24									
Percentage of all samples		0.7	0.8								

3.1 Verification

Data verification was the first step in the data quality assessment process. The verification process generally included checks to verify compliance with the sampling plan and with the QA/QC practices. Information contained in the laboratory reports was verified to be complete, correct and free of inconsistencies.

3.2 Validation

Data validation was performed in accordance with the National Functional Guidelines for Organic Review (EPA 540-R-99-008, October 1999), Low Concentration Organic Review (EPA 540-R-00-006, June 2001) and Inorganic Data Review (EPA 540-R-01-008, July 2002). All laboratory and field data generated under the program were reviewed for accuracy, precision and completeness. The review included:

- Data package completeness
- Chain-of-Custody
- Use of specified analytical methods
- Holding times for extraction and analysis
- Blanking results (equipment, bottle, filter, and method blanks) relative to the reporting limits and sample concentrations
- Field duplicate frequency and precision
- Laboratory duplicates, frequency and precision
- Laboratory Control Sample frequency, compounds and recoveries
- Surrogate standard frequency, compounds and recoveries
- Matrix spike frequency, compounds and recoveries
- Matrix spike duplicate frequency and relative percent differences
- Reporting limits and dilution factors

3.3 Holding Times

Thirty-seven sample records out of a total of 2,840 were possibly prepared out of hold time. The excursions are summarized in table A-3 which shows they were all processed within 125% of the target elapsed time. No further action was warranted.

3.4 Equipment Blanks

The results of field-related blanking activities are summarized in Table A-4. Blanks were analyzed to assess potential contamination from monitoring site intake hoses, the sub-sampling process, and composite bottles. Equipment was tested for Total Metals (Al, As, Cd, Cr, Cu, Pb, Ni, Ag, Zn) and four conventional contaminants (COD, TOC, Nitrate as N, and Total Phosphorus).

An intake hose is installed at each station and leads from the sample basin to the sampler. One blank analysis was performed on the set of hoses. Blanks for 20L bottles are done on a per batch basis. Six batches of ten bottles were cleaned for Long Beach this year with one bottle from each serving as the blank for that group. Subsampling hose is used post storm to remove the water from the 20L bottles and distribute it to the containers for the laboratories. One subsampling hose was blanked this year. In addition, one set of sample containers per batch of bottles ordered are blanked to ensure no contamination is being brought in from an outside source. One set of subsampling containers was blanked this year. No contaminants were found in any of the blanking studies performed for the 2008/2009 sampling season.

In general, if a contaminate is found in an equipment blanking study, all associated samples that have a concentration less than five times the blank hit are qualified with a 'J+' flag. Samples with relatively high concentrations are unaffected. Although silver was found at the detection limit of 0.20 µg/L in one of the subsampling containers, no further qualifications were needed since all sample values came in under the detection limit. In the remaining blanking studies associated with the Long Beach 2008/2009 storm season, no samples were qualified as a result of an equipment blanking hit.

3.5 Field Duplicates

Field duplicate results are summarized in Table A-5. Sample volumes were sufficient for field duplication for four of the events monitored during the project year including the first dry weather event and 3 storm events.

Strict criteria are not established for the evaluation of field duplicates. Rather samples are evaluated based upon best professional judgment. RPDs were highlighted when greater than 50% and were given closer scrutiny. As a general rule, Kinnetic Laboratories considers values to be of concern if above 50% provided both values are greater than five times the reporting limit. In cases where one or both values are less than five times the reporting limit those values are considered to be of potential concern if the difference between the two values is greater than twice the reporting limit. The excursions from these guidelines are as discussed below.

3.5.1 Grabs

Oil and grease and bacteria samples were collected manually as grab samples. True field duplicates were collected for these constituents. Sampling was performed sequentially maintaining a minimum period of time between each sample. All oil and grease field duplicates were within an acceptable range.

High RPDs encountered for bacteria are typical of repeated measurements of microbial constituents in receiving waters. Of the 12 bacteria duplicates, nine have RPDs that are 50% or less; three have RPDs greater than or equal to 100%.

The three largest bacteria excursions were examined in closer detail and because of both a high RPD and a substantial absolute difference the associated samples were qualified with a J to indicate that they are considered to be estimates.

3.5.2 Composites Sub-sampling Splits

Sub-sampling splits of the composite samples, while not true field duplicates, are assessed as field duplicates. They indicate that the sub-sampling process was, in most cases, able to effectively obtain representative samples from the composite during the project.

Six instances of elevated RPD were in the composite splits were examined in greater detail. Nitrate and nitrite were not detected in the first Dry Weather Event but the reporting limits were elevated in both the sample and the field duplicate and this led to an elevated reporting limit. The sample was diluted 5x and 20x for the field duplicate. The RPD is an estimate using half the RL and as such is an artifact of the computation rather than a real indicator of homogeneity and no further qualification was warranted.

Dissolved nickel RPD for Storm Event 2 (December 15, 2008) was 140% and the absolute difference was 10.8 with an RL of 0.05 µg/L. The corresponding samples were qualified with a J to indicate that they are to be treated as estimates.

Total lead for the first dry weather (July 2, 2008) event had an RPD of 53% with an absolute difference of 1.3 µg/L and an RL of 0.5 µg/L. Dissolved Lead for the third storm event (05-Feb-2009) had an RPD of 82% with an absolute difference of 0.64 µg/L and an RL of 0.5 µg/L. No further action was taken.

3.2 Reporting and Detection Limits

Reporting limits are important for values reported as non-detect. The data archive was filtered for non-detects and those cases were checked and compared with the target minimum levels. The results of the RL analysis are summarized in Table A-6.

The elevated nitrite and nitrate RLs for the first dry weather event have been discussed in the previous section because of the high RPD estimate between the sample and its field duplicate. The other cases were also with nitrite and nitrate where dilution caused an elevated RL but the effects were less noticeable the values were reported down the MDL which was at or below the target RL.

3.3 Method Blanks (BLK)

Only minor contaminant concentrations were found in the method blank samples. Seventy-six cases out of the 1,064 method blanks reported for this project were reported with values exceeding the MDL. In all cases the concentrations reported were well under the RL and the sample results were unaffected.

3.4 Laboratory Replicates (DUP)

Laboratory replicates are a measure of precision. Because the field samples are split and analyzed it is a measure of both the laboratory analysis and the sample homogeneity. When the RPD between sample and duplicate is above the objective it is flagged for further review. Small values below the reporting limit can lead to large RPDs but the differences between the values are small (less than the RL) and not a concern. All other cases with elevated RPDs are subjected to extended review.

All laboratory replicates were within QC range with only a handful of minor excursions. The details are summarized in Table A-7. Toxaphene from the second storm event and trans-Nonachlor from the third storm event had sufficient DUP deviation that the values were flagged with J or UJ for non-detects to indicate that they are estimates.

3.5 Blank Spikes/Blank Spike Duplicates (BS/BSD)

Blank Spikes and their duplicates (BS/BSD) are solutions of known compounds and selected concentrations in clean laboratory water. Precision and accuracy are evaluated in a similar fashion as MS/MSDs with the exception that there is no source sample to subtract and no matrix interference issues.

All BS/BSD QC was within range with the following exceptions (Table A-8). One batch of Organophosphates (43033) had one or more QC excursions. Both spikes were in range but with RPDs that were out of the QC limit of 30%. These were within 10% of acceptable and did not ultimately warrant qualifying the sample results.

3.6 Matrix Spikes/Matrix Spike Duplicates (MS/MSD)

Matrix Spike and Matrix Spike Duplicate (MS/MSD) percent recoveries were evaluated to determine acceptable accuracy based on method-specific percent recoveries. Precision was evaluated by calculating the RPD of the MS/MSD recovery results. When spikes are reported below the accepted range they indicate a low bias to the results and when reported above the accepted range they indicate a high bias.

QA/QC guidelines indicate that no action need be taken on MS/MSD data alone. The data reviewer may use the MS/MSD results in conjunction with other QC criteria when determining the need for further qualification. The matrix spike and their duplicates were recovered within an acceptable range during the project year with the exceptions summarized in Table A-9.

Most exceptions were where the spike recoveries were high when compared with QC limits and in those cases the bias is towards a high estimate. Where the associate samples are non-detects no further qualification is necessary.

A few had low recoveries and so a bias towards a low estimate and these potentially affect even the non-detects. Four cases are worth noting.

Chlorinated Pesticide MS and MSD recoveries were 0% for Fenthion for the first Dry Weather event. This lead to qualifying the associated samples with UJ- to indicate that they are low estimates. High MS-MSD recoveries for Dichlorovos, Malathion and Simazine led to J+ qualifications for detected values associated with two batches while the non-detects where unaffected.

3.7 Certified Reference Material (CRM)

Certified Reference Material is analyzed to verify the laboratory's ability to analyze a matrix that is comparable to that of the field samples. All CRM's were recovered within acceptable QC range for this project.

3.8 Surrogate Recoveries

Surrogate analytes behave similarly to the target analytes. Surrogate spikes are introduced into the samples at specific concentrations and are used to provide a measure of instrument and method performance and to indicate sample-specific matrix effects. Based upon logic similar to that offered for matrix spikes, no action is required based on surrogate recoveries alone but they should be considered in context with other QC records. The surrogate recoveries were all within range for the project year.

3.9 Total and Dissolved Metals

Total and dissolved metals where checked against one another to see if there were cases where the dissolved fraction was greater than the total. The cases where one was reported as non-detect and the other was reported as a value below the MDL are not a concern and were eliminated on a first pass.

There was only one case of concern and that had been addressed during the field duplicate analysis. Dissolved nickel was 13 µg/L and total nickel was 6.6 µg/L in the field duplicate with corresponding value of 2.2 µg/L for dissolved and 4.8 µg/L for total nickel for the sample value. Dissolved nickel for that event was qualified as a result but the total nickel value was deemed unaffected.

3.10 Completeness

No containers were lost or broken and all samples were received in good condition by the laboratory. No data were rejected during the QC process. One hundred percent completeness was achieved for this project.

4.0 ASSESSMENT OF TOXICITY ANALYSES

All *Ceriodaphnia* toxicity tests met critical test acceptability criteria (TACs) and were performed within sample holding times with one exception. The Belmont Pump Station sample from the first wet weather test (collected November 26 2008) was held in cold storage for 80 hours prior to test setup due to laboratory loading and holiday scheduling conflicts. The results were judged to be valid.

Likewise, the sea urchin bioassay on the first Belmont Pump Station storm sample exceeded the 72-hour recommended maximum holding time by thirty hours.

Quality assurance exceptions are summarized in Table A-10.

4.1 Water Flea Tests

The water flea toxicity tests were conducted according to USEPA protocol guidelines, and there were only minor procedural problems (holding time exceedences) with tests conducted on wet or dry weather samples. In all water flea bioassays, dissolved oxygen and pH measurements remained within acceptable limits. In most tests there were very small (< 0.5°C) temperature excursions outside protocol recommendations which were corrected by adjusting room temperature controls. Samples were renewed each day with aliquots within the recommended pH range. All reference toxicant tests produced LC₅₀s and EC₅₀s that were within laboratory control chart limits.

4.2 Sea Urchin Tests

Sea urchin fertilization tests were conducted according to protocol guidelines.

All sea urchin tests met TACs, and all environmental monitoring values were within recommended ranges. All concurrent reference toxicant tests produced EC₅₀s that were within laboratory control chart limits.

4.3 Sample Holding Times

The holding time for each sample and test is presented in Table A-11. The objective of <36 hours holding before test initiation was met for 56% of the samples; and tests for 89% of the samples were started within the allowable extended holding time window of 72 hours. Failure to meet the 72 hour holding time was due to laboratory loading problems or to unresolvable holiday scheduling difficulties.

The effect of extended cold storage on stormwater toxicity is unpredictable. The 36-hr storage objective used in this program was adapted from guidance for wastewater effluent testing developed by USEPA. The same guidance allows an extension of holding time to 72 hours when required by sample shipping or other logistic considerations. Extended storage times may have resulted in toxicity loss due to contaminant degradation or

sorption to the storage container. The impact of such potential losses in this program cannot be assessed, since toxicity was not detected in samples that experienced the most extended storage.

5.0 QA/QC CONCLUSIONS

A careful review of the results confirmed that the laboratories met most QA/QC requirements. Overall evaluation of the QA/QC data indicates that the chemical data are for the most part within established performance criteria and can be used for general characterization of sediments in the proposed project area.

Table A-3. Days from Sampling Event to Sample Preparation in which Holding Times were Exceeded.

Analyte (HOLD)	Holding Time	Dry Weather Event-01	Storm Event-01		Storm Event-02		
	(Days)	Los Cerritos Channel	Belmont Pump	Dominguez Gap	Belmont Pump	Bouton Creek	Dominguez Gap
Conventionals							
Biochemical Oxygen Demand	2	29.125	2.5	2.5	2.125	2.04	2.2
MBAS	2		2.5	2.4			2.04
Nitrate (as N)	2		2.4	2.4			2.04
Nitrite (as N)	2		2.4	2.4			2.04
Orthophosphate (as P)	2		2.5	2.5			
Total Dissolved Solids	7		7.25	7.2			
Total Kjeldahl Nitrogen	28						
Total Suspended Solids	7		8.3	8.3			
Volatile Suspended Solids	7		8.3	8.3			
Turbidity	2		2.5	2.5			2.04

Table A-4 Summary of Blanking Results Associated with Field Activities.

		Installed Intake Hose		Composite Bottles		Subsampling Hose		Subsampling Containers	
	Reporting Limit	# of Detections	# of Analyses	# of Detection	# of Analyses	# of Detections	# of Analyses	# of Detections	# of Analyses
Analyte									
CONVENTIONALS (mg/L)									
Chemical Oxygen Demand (COD)	4.0	0	1	0	6	0	1	0	1
Total Organic Carbon (TOC)	1.0	0	1	0	6	0	1	0	1
Nitrate-N	0.10	0	1	0	6	0	1	0	1
Total P	0.01	0	1	0	6	0	1	0	1
TOTAL METALS (µg/L)									
Aluminum	25	0	1	0	6	0	1	0	1
Arsenic	0.50	0	1	0	6	0	1	0	1
Cadmium	0.20	0	1	0	6	0	1	0	1
Chromium	0.50	0	1	0	6	0	1	0	1
Copper	0.50	0	1	0	6	0	1	0	1
Lead	0.20	0	1	0	6	0	1	0	1
Nickel	0.50	0	1	0	6	0	1	0	1
Silver	0.20	0	1	0	6	0	1	1	1
Zinc	1.0	0	1	0	6	0	1	0	1

Table A.5. Field Duplicate Relative Percent and Absolute Differences 2008/2009.

Valid Name	Dry 1 02-Jul-2008		Storm 1 26-Nov-2008		Storm 2 15-Dec-2008		Storm 3 05-Feb-2009	
	RPD	Diff	RPD	Diff	RPD	Diff	RPD	Diff
Conventionals								
Alkalinity as CaCO ₃	0	0	0	0	6.1	1	0	0
Biochemical Oxygen Demand	4.9	1	38	7	11	2	13	1.2
Chemical Oxygen Demand	9.5	20	19	15	19	13	18	20
Chloride	0	0	3.4	0.3	0	0	2	0.1
Conductivity	0	0	0	0	0	0	0	0
Fluoride	62	0.9	8.7	0.01	0	0	0	0
Hardness as CaCO ₃	5.7	40	4.9	1	4.9	1	0	0
MBAS	2.8	0.001	0	0	19	0.019	19	0.04
Nitrate (as N)	120*	0.75*	3.9	0.03	1.9	0.01	0	0
Nitrite (as N)	120*	0.75*	3.6	0.001	0	0	3.3	0.002
Oil and Grease	0*	0*	0*	0*	37	1	8.8	0.5
Total Ammonia (as N)	3.9	0.01	3.8	0.01	32	0.05	0	0
Total Dissolved Solids	2.3	100	3.1	2	20	14	11	7
Total Kjeldahl Nitrogen	5.9	0.2	4.7	0.1	12	0.2	9.5	0.2
Total Organic Carbon	0	0	7.4	1	55	6.9	17	2
Orthophosphate (as P)	36	0.007	2.8	0.02	2.7	0.01	0	0
Total Phosphorus	3.9	0.01	0	0	9.5	0.1	8.4	0.08
Total Recoverable Phenolics	0*	0*	0*	0*	0*	0*	0*	0*
Total Suspended Solids	4.4	3	5.7	10	0	0	5.4	10
Volatile Suspended Solids	15	4	17	16	8.7	4	11	7
Turbidity	32	6	0	0	3.6	1	9.5	7
Dissolved Metals								
Aluminum	0	0	18	4	11	2	90*	20*
Arsenic	6.1	0.3	4.2	0.04	4.2	0.04	0	0
Cadmium	11	0.01	15	0.007	2	0.001	29	0.02
Chromium	10	0.04	5.1	0.02	1.4	0.01	19	0.19
Copper	1.7	0.1	0	0	0	0	9	0.7
Iron	27	5	1.8	1	46	23	110	111
Lead	1.9	0.01	2.2	0.02	0	0	82	0.64
Nickel	6.9	0.2	4.1	0.1	140	10.8	40	0.8
Selenium	0*	0*	0*	0*	0*	0*	0*	0*
Silver	14	0.002	0	0	86	0.027	145*	0.084*
Zinc	2.7	0.2	0	0	1.7	1	16	7
Total Metals								
Aluminum	23	50	29	700	38	450	0	0
Arsenic	1.6	0.1	20	0.5	18	0.3	8	0.2
Cadmium	21	0.04	17	0.13	31	0.11	20	0.13
Chromium	39	0.39	27	1.9	23	1	3.9	0.3
Copper	8	1	19	11	17	6	5.9	2
Iron	50	200	27	1200	31	700	4.5	200
Lead	53	1.3	28	10	25	4	0	0
Nickel	5	0.2	17	1.5	29	1.6	8.5	0.7
Selenium	0*	0*	0*	0*	0*	0*	0*	0*
Silver	10	0.008	22	0.03	23	0.01	0	0
Zinc	36	10	27	90	15	30	4.3	10

Table A.5. Field Duplicate Relative Percent and Absolute Differences 2008/2009.

Valid Name	Dry 1 02-Jul-2008		Storm 1 26-Nov-2008		Storm 2 15-Dec-2008		Storm 3 05-Feb-2009	
	RPD	Diff	RPD	Diff	RPD	DIFF	RPD	DIFF
<i>Bacteria</i>								
Enterococcus	40	70	24	8000	33	9000	12	2000
Fecal Coliform	26	500	31	8000	19	3000	140	13000
Total Coliform	140	13000	100	60000	31	8000	22	6000
<i>Aroclors</i>								
Aroclor 1016	0*	0*	0*	0*	0*	0*	0*	0*
Aroclor 1221	0*	0*	0*	0*	0*	0*	0*	0*
Aroclor 1232	0*	0*	0*	0*	0*	0*	0*	0*
Aroclor 1242	0*	0*	0*	0*	0*	0*	0*	0*
Aroclor 1248	0*	0*	0*	0*	0*	0*	0*	0*
Aroclor 1254	0*	0*	78*	0.056*	0*	0*	0*	0*
Aroclor 1260	0*	0*	0*	0*	0*	0*	0*	0*
<i>Chlorinated Pesticides</i>								
2,4'-DDD	0*	0*	0*	0*	0*	0*	0*	0*
2,4'-DDE	0*	0*	0*	0*	0*	0*	0*	0*
2,4'-DDT	0*	0*	0*	0*	0*	0*	0*	0*
4,4'-DDD	0*	0*	0*	0*	0*	0*	0*	0*
4,4'-DDE	0*	0*	1.9	0.0003	25	0.0026	0*	0*
4,4'-DDT	0*	0*	0*	0*	0*	0*	0*	0*
Aldrin	0*	0*	0*	0*	0*	0*	0*	0*
Dieldrin	0*	0*	0*	0*	0*	0*	0*	0*
Endrin	0*	0*	0*	0*	0*	0*	0*	0*
Endrin aldehyde	0*	0*	0*	0*	0*	0*	0*	0*
Endrin ketone	0*	0*	0*	0*	0*	0*	0*	0*
alpha-BHC	0*	0*	0*	0*	0*	0*	0*	0*
beta-BHC	0*	0*	0*	0*	0*	0*	0*	0*
delta-BHC	0*	0*	0*	0*	0*	0*	0*	0*
gamma-BHC (Lindane)	0*	0*	0*	0*	0*	0*	0*	0*
Endosulfan I	0*	0*	0*	0*	0*	0*	0*	0*
Endosulfan II	0*	0*	0*	0*	0*	0*	0*	0*
Endosulfan sulfate	0*	0*	0*	0*	0*	0*	0*	0*
alpha-Chlordane	0*	0*	7.9	0.0091	20	0.0042	0*	0*
gamma-Chlordane	0*	0*	14	0.0154	17	0.0035	0*	0*
Heptachlor	0*	0*	0*	0*	0*	0*	0*	0*
Heptachlor epoxide	0*	0*	0*	0*	0*	0*	0*	0*
Oxychlordane	0*	0*	0*	0*	0*	0*	0*	0*
cis-Nonachlor	0*	0*	17	0.0025	0*	0*	0*	0*
trans-Nonachlor	0*	0*	28	0.0207	11	0.0019	0*	0*
Methoxychlor	0*	0*	0*	0*	0*	0*	0*	0*
Mirex	0*	0*	0*	0*	0*	0*	0*	0*
Toxaphene	0*	0*	0*	0*	40	0.109	0*	0*

Table A.5. Field Duplicate Relative Percent and Absolute Differences 2008/2009.

Valid Name	Dry 1 02-Jul-2008		Storm 1 26-Nov-2008		Storm 2 15-Dec-2008		Storm 3 05-Feb-2009	
	RPD	Diff	RPD	Diff	RPD	Diff	RPD	Diff
Organophosphates								
Bolstar (Sulprofos)	0*	0*	0*	0*	0*	0*	0*	0*
Chlorpyrifos	0*	0*	0*	0*	0*	0*	0*	0*
Demeton	0*	0*	0*	0*	0*	0*	0*	0*
Diazinon	0*	0*	0*	0*	0*	0*	0*	0*
Dichlorvos	0*	0*	0*	0*	0*	0*	0*	0*
Dimethoate	0*	0*	0*	0*	0*	0*	0*	0*
Disulfoton	0*	0*	0*	0*	0*	0*	0*	0*
Ethoprop	0*	0*	0*	0*	0*	0*	0*	0*
Fensulfothion	0*	0*	0*	0*	0*	0*	0*	0*
Fenthion	0*	0*	0*	0*	0*	0*	0*	0*
Malathion	0*	0*	34	0.3607	19	0.0676	28	0.0393
Merphos	0*	0*	0*	0*	0*	0*	0*	0*
Methyl Parathion	0*	0*	0*	0*	0*	0*	0*	0*
Mevinphos	0*	0*	0*	0*	0*	0*	0*	0*
Phorate	0*	0*	0*	0*	0*	0*	0*	0*
Tetrachlorvinphos (Stirophos)	0*	0*	0*	0*	0*	0*	0*	0*
Tokuthion (Prothiofos)	0*	0*	0*	0*	0*	0*	0*	0*
Trichloronate	0*	0*	0*	0*	0*	0*	0*	0*
Triazines								
Ametryn	0*	0*	0*	0*	0*	0*	0*	0*
Atraton	0*	0*	0*	0*	0*	0*	0*	0*
Atrazine	0*	0*	0*	0*	0*	0*	0*	0*
Cyanazine	0*	0*	0*	0*	0*	0*	0*	0*
Prometon	0*	0*	0*	0*	0*	0*	0*	0*
Prometryn	0*	0*	0*	0*	0*	0*	0*	0*
Propazine	0*	0*	0*	0*	0*	0*	0*	0*
Sebumeton	0*	0*	0*	0*	0*	0*	0*	0*
Simazine	0*	0*	0*	0*	0*	0*	0*	0*
Simetryn	0*	0*	0*	0*	0*	0*	0*	0*
Terbutryn	0*	0*	0*	0*	0*	0*	0*	0*
Terbutylazine	0*	0*	0*	0*	0*	0*	0*	0*

* Calculations are estimates. One or more values reported as ND and 1/2 RL used in calculation

Table A-6. Instances of Elevated Non Detects.

Analyte (RL)	RL	Dry Weather Event-01	Dry Weather Event-01	Dry Weather Event-02
		Long Beach Pump	Los Cerritos Channel	Los Cerritos Channel
Conventionals (mg/L)				
Nitrate (as N)	0.1	2 (0.4) ¹	0.5 (0.1)	0.2 (0.04)
Nitrite (as N)	0.1	2 (0.4)	0.5 (0.1)	0.2 (0.04)

1. Values are reported as RL (MDL)

Table A-7. Extended Review of Laboratory Replicates.

Analyte (DUP)	BatchID	Resulting Qualifier	One or both Values < RL?	Both Values < 5 X RL?	Notes
Chlorinated Pesticides					
alpha-Chlordane	43033	pass	No	Yes	Values of 0.0109 and 0.0064 µg/L; RPD of 52%; Difference is 0.0045 µg/L; RL is 0.005 µg/L.
gamma-Chlordane	43033	pass	No	Yes	Values of 0.009 and 0.0061 µg/L; RPD of 38%; Difference is 0.0029 µg/L; RL is 0.005 µg/L.
gamma-Chlordane	44007	pass	Yes	Yes	Values of 0.0066 and 0.0036J µg/L; RPD of 59%; Difference is 0.003 µg/L; RL is 0.005 µg/L.
Toxaphene	44007	J	No	No	Values of 0.41 and 0.241 µg/L; RPD of 52%; Difference is 0.169 µg/L; RL is 0.05 µg/L.
trans-Nonachlor	43033	J	Yes	Yes	Values of 0.01 and 0.0046J µg/L; RPD of 74%; Difference is 0.0054 µg/L; RL is 0.005 µg/L.
trans-Nonachlor	44007	pass	Yes	Yes	Values of 0.0052 and 0.0035J µg/L; RPD of 39%; Difference is 0.0017 µg/L; RL is 0.005 µg/L.
trans-Nonachlor	45145	pass	Yes	Yes	Values of 0.0042J and 0.0101 µg/L; RPD of 83%; Difference is 0.0059 µg/L; RL is 0.005 µg/L.

Table A-8. Extended Review of BS/BSD Pairs.

Analyte (BS/BSD)	Batch	Spike Recovery Objectives	Resulting Intermediate Qualifier	One or More Spike Recoveries Below LCL?	One or More Spike Recoveries Above UCL?	Exceeds RPD Limit?	Notes
Organophosphates							
Bolstar (Sulprofos)	43033	55 - 143%	J	No	No	Yes	BS:123%; BSD:83%; RPD: 39% .
Fenitrothion	43033	36 - 168%	J	No	No	Yes	BS:124%; BSD:86%; RPD: 36% .
Merphos	43033	45 - 135%	J	No	No	Yes	BS:96%; BSD:70%; RPD: 31% .
Phosmet	43033	25 - 162%	J	No	No	Yes	BS:94%; BSD:67%; RPD: 34% .

Bolded values are out of QC limits

Table A-9. Extended Review of MS/MSD pairs.

Analyte (MS/MSD)	Batch	Spike Recovery Objectives	Resulting Intermediate Qualifier	One or More Spike Recoveries Below LCL?	One or More Spike Recoveries Above UCL?	Exceeds RPD Limit?	Spike Conc. ¹	Notes
Chlorinated Pesticides								
2,4'-DDD	43033	50 - 140%	J+	No	Yes	No	0.4256	MS:189%; MSD:188%; RPD:1%.
2,4'-DDD	44007	50 - 140%	J+	No	Yes	No	0.5	MS:143%; MSD:134%; RPD:6%.
2,4'-DDD	47135	50 - 140%	J+	No	Yes	No	0.5128	MS:144%; MSD:140%; RPD:3%.
4,4'-DDD	43033	60 - 140%	J+	No	Yes	No	0.4256	MS:213%; MSD:205%; RPD:4%.
4,4'-DDD	44007	60 - 140%	J+	No	Yes	No	0.5	MS:161%; MSD:165%; RPD:2%.
beta-BHC	43033	48 - 145%	J+	No	Yes	No	0.4256	MS:187%; MSD:202%; RPD:8%.
Endosulfan I	43033	59 - 145%	J+	No	Yes	No	0.4256	MS:158%; MSD:190%; RPD:18%.
Endrin	43033	56 - 145%	J+	No	Yes	No	0.4256	MS:202%; MSD:213%; RPD:5%.
Endrin ketone	44007	54 - 143%	J-	Yes	No	No	0.5	MS:48%; MSD:53%; RPD:10%.
Heptachlor	43033	60 - 146%	J+	No	Yes	No	0.4256	MS:136%; MSD:161%; RPD:17%.
Methoxychlor	43033	34 - 143%	J+	No	Yes	No	0.4256	MS:246%; MSD:83%; RPD:99%.
Methoxychlor	44007	34 - 143%	J+	No	Yes	No	0.5	MS:152%; MSD:148%; RPD:3%.
Mirex	44007	51 - 138%	J-	No	Yes	No	0.5	MS:49%; MSD:54%; RPD:10%.
Organophosphates								
Bolstar (Sulprofos)	43033	55 - 143%	J+	No	Yes	No	0.4256	MS:433%; MSD:524%; RPD:19%.
Bolstar (Sulprofos)	44007	55 - 143%	J+	No	Yes	No	0.5	MS:272%; MSD:254%; RPD:7%.
Bolstar (Sulprofos)	47135	55 - 143%	J+	No	Yes	No	0.5128	MS:165%; MSD:194%; RPD:16%.
Chlorpyrifos	43033	55 - 137%	J+	No	Yes	No	0.4256	MS:217%; MSD:245%; RPD:12%.
Chlorpyrifos	44007	55 - 137%	J+	No	Yes	No	0.5	MS:156%; MSD:170%; RPD:9%.
Demeton	43033	21 - 128%	J+	No	Yes	No	0.4256	MS:282%; MSD:328%; RPD:15%.
Demeton	44007	21 - 128%	J+	No	Yes	No	0.5	MS:156%; MSD:186%; RPD:18%.
Diazinon	43033	56 - 134%	J+	No	Yes	No	0.4256	MS:322%; MSD:378%; RPD:16%.
Diazinon	44007	56 - 134%	J+	No	Yes	No	0.5	MS:217%; MSD:250%; RPD:14%.
Dichlorvos	43033	59 - 136%	J+	No	Yes	No	0.4256	MS:224%; MSD:273%; RPD:20%.
Dichlorvos	44007	59 - 136%	J+	No	Yes	No	0.5	MS:165%; MSD:182%; RPD:10%.
Dimethoate	43033	46 - 149%	J+	No	Yes	Yes	0.4256	MS:196%; MSD:269%; RPD:31%.
Dimethoate	44007	46 - 149%	J+	No	Yes	No	0.5	MS:346%; MSD:353%; RPD:2%.
Disulfoton	43033	16 - 118%	J+	No	Yes	No	0.4256	MS:174%; MSD:205%; RPD:16%.
Disulfoton	44007	16 - 118%	J+	No	Yes	No	0.5	MS:158%; MSD:178%; RPD:12%.
Ethoprop	43033	55 - 141%	J+	No	Yes	No	0.4256	MS:318%; MSD:376%; RPD:17%.
Ethoprop	44007	55 - 141%	J+	No	Yes	No	0.5	MS:197%; MSD:207%; RPD:5%.

Analyte (MS/MSD)	Batch	Spike Recovery Objectives	Resulting Intermediate Qualifier	One or More Spike Recoveries Below LCL?	One or More Spike Recoveries Above UCL?	Exceeds RPD Limit?	Spike Conc. ¹	Notes
Ethyl Parathion	43033	43 - 150%	J+	No	Yes	No	0.4256	MS: 289% ; MSD: 315% ; RPD:9%.
Ethyl Parathion	44007	43 - 150%	J+	No	Yes	No	0.5	MS: 266% ; MSD: 287% ; RPD:8%.
Fenchlorphos (Ronnell)	43033	59 - 135%	J+	No	Yes	No	0.4256	MS: 261% ; MSD: 289% ; RPD:10%.
Fenchlorphos (Ronnell)	44007	59 - 135%	J+	No	Yes	No	0.5	MS: 214% ; MSD: 231% ; RPD:8%.
Fenchlorphos (Ronnell)	45145	59 - 135%	J-	Yes	No	No	0.8888	MS: 51% ; MSD:60%; RPD:16%.
Fenitrothion	43033	36 - 168%	J+	No	Yes	No	0.4256	MS: 521% ; MSD: 558% ; RPD:7%.
Fenitrothion	44007	36 - 168%	J+	No	Yes	No	0.5	MS: 451% ; MSD: 462% ; RPD:2%.
Fensulfothion	44007	54 - 150%	J+	No	Yes	No	0.5	MS: 282% ; MSD: 302% ; RPD:7%.
Fensulfothion	47135	54 - 150%	J+	No	Yes	No	0.5128	MS: 346% ; MSD: 358% ; RPD:3%.
Fenthion	38137	52 - 128%	J-	Yes	No	No	0.4652	MS: 0% ; MSD: 0% ; RPD:0%.
Fenthion	43033	52 - 128%	J+	No	Yes	No	0.4256	MS: 319% ; MSD: 363% ; RPD:13%.
Fenthion	44007	52 - 128%	J+	No	Yes	No	0.5	MS: 249% ; MSD: 261% ; RPD:5%.
Fenthion	47135	52 - 128%	J+	No	Yes	No	0.5128	MS:127%; MSD: 132% ; RPD:4%.
Malathion	43033	64 - 142%	J+	No	Yes	No	0.4256	MS: 472% ; MSD: 572% ; RPD:19%.
Malathion	44007	64 - 142%	J+	No	Yes	No	0.5	MS: 351% ; MSD: 353% ; RPD:1%.
Merphos	43033	45 - 135%	J+	No	Yes	No	0.4256	MS: 513% ; MSD: 555% ; RPD:8%.
Merphos	44007	45 - 135%	J+	No	Yes	No	0.5	MS: 274% ; MSD: 259% ; RPD:6%.
Merphos	47135	45 - 135%	J+	No	Yes	No	0.5128	MS: 174% ; MSD: 174% ; RPD:0%.
Methamidophos	43033	0 - 211%	J+	No	Yes	No	0.4256	MS: 623% ; MSD: 741% ; RPD:17%.
Methidathion	43033	33 - 152%	J+	No	Yes	No	0.4256	MS: 401% ; MSD: 453% ; RPD:12%.
Methidathion	44007	33 - 152%	J+	No	Yes	No	0.5	MS: 376% ; MSD: 371% ; RPD:1%.
Methidathion	47135	33 - 152%	J+	No	Yes	No	0.5128	MS: 164% ; MSD: 163% ; RPD:1%.
Methyl Parathion	43033	49 - 141%	J+	No	Yes	No	0.4256	MS: 487% ; MSD: 505% ; RPD:4%.
Methyl Parathion	44007	49 - 141%	J+	No	Yes	No	0.5	MS: 381% ; MSD: 371% ; RPD:3%.
Methyl Parathion	47135	49 - 141%	J+	No	Yes	No	0.5128	MS: 147% ; MSD: 149% ; RPD:1%.
Mevinphos	43033	61 - 141%	J+	No	Yes	No	0.4256	MS: 467% ; MSD: 526% ; RPD:12%.
Mevinphos	44007	61 - 141%	J+	No	Yes	No	0.5	MS: 215% ; MSD: 251% ; RPD:15%.
Phorate	43033	47 - 119%	J+	No	Yes	No	0.4256	MS: 345% ; MSD: 379% ; RPD:9%.
Phorate	44007	47 - 119%	J+	No	Yes	No	0.5	MS: 265% ; MSD: 276% ; RPD:4%.
Phosmet	43033	25 - 162%	J+	No	Yes	No	0.4256	MS: 482% ; MSD: 364% ; RPD:28%.
Phosmet	44007	25 - 162%	J+	No	Yes	No	0.5	MS: 507% ; MSD: 487% ; RPD:4%.
Tetrachlorvinphos (Stirophos)	43033	65 - 146%	J+	No	Yes	No	0.4256	MS: 495% ; MSD: 546% ; RPD:10%.
Tetrachlorvinphos (Stirophos)	44007	65 - 146%	J+	No	Yes	No	0.5	MS: 302% ; MSD: 302% ; RPD:0%.
Tetrachlorvinphos (Stirophos)	47135	65 - 146%	J+	No	Yes	No	0.5128	MS: 253% ; MSD: 269% ; RPD:6%.

Analyte (MS/MSD)	Batch	Spike Recovery Objectives	Resulting Intermediate Qualifier	One or More Spike Recoveries Below LCL?	One or More Spike Recoveries Above UCL?	Exceeds RPD Limit?	Spike Conc. ¹	Notes
Tokuthion (Prothiofos)	43033	61 - 135%	J+	No	Yes	No	0.4256	MS: 317% ; MSD: 340% ; RPD:7%.
Tokuthion (Prothiofos)	44007	61 - 135%	J+	No	Yes	No	0.5	MS: 240% ; MSD: 256% ; RPD:6%.
Tokuthion (Prothiofos)	47135	61 - 135%	J+	No	Yes	No	0.5128	MS: 138% ; MSD: 146% ; RPD:6%.
Trichloronate	43033	53 - 136%	J+	No	Yes	No	0.4256	MS: 236% ; MSD: 273% ; RPD:15%.
Trichloronate	44007	53 - 136%	J+	No	Yes	No	0.5	MS: 196% ; MSD: 214% ; RPD:9%.
PCB Congeners								
PCB003	44007	57 - 128%	J+	No	Yes	No	0.4	MS: 186% ; MSD: 192% ; RPD:3%.
PCB008	44007	65 - 121%	J+	No	Yes	No	0.4	MS: 160% ; MSD: 183% ; RPD:13%.
PCB018	44007	60 - 123%	J+	No	Yes	No	0.4	MS:120%; MSD: 131% ; RPD:9%.
PCB028	43033	68 - 113%	J+	No	Yes	No	0.3405	MS:108%; MSD: 134% ; RPD:21%.
PCB028	44007	68 - 133%	J+	No	Yes	No	0.4	MS: 172% ; MSD: 178% ; RPD:3%.
PCB031	44007	64 - 122%	J+	No	Yes	No	0.4	MS: 147% ; MSD: 143% ; RPD:3%.
PCB033	44007	69 - 120%	J+	No	Yes	No	0.4	MS: 155% ; MSD: 170% ; RPD:9%.
PCB037	44007	74 - 135%	J+	No	Yes	No	0.4	MS: 196% ; MSD: 196% ; RPD:0%.
PCB044	44007	68 - 123%	J+	No	Yes	No	0.4	MS: 135% ; MSD: 145% ; RPD:7%.
PCB049	44007	67 - 115%	J+	No	Yes	No	0.4	MS: 132% ; MSD: 139% ; RPD:5%.
PCB052	44007	68 - 122%	J+	No	Yes	No	0.4	MS: 133% ; MSD: 146% ; RPD:9%.
PCB066	44007	70 - 119%	J+	No	Yes	No	0.4	MS: 143% ; MSD: 145% ; RPD:1%.
PCB070	44007	70 - 137%	J+	No	Yes	No	0.4	MS: 143% ; MSD: 149% ; RPD:4%.
PCB074	44007	75 - 135%	J+	No	Yes	No	0.4	MS: 150% ; MSD: 156% ; RPD:4%.
PCB077	44007	74 - 137%	J+	No	Yes	No	0.4	MS: 139% ; MSD: 141% ; RPD:1%.
PCB081	44007	71 - 138%	J+	No	Yes	No	0.4	MS: 143% ; MSD: 142% ; RPD:1%.
PCB087	44007	73 - 116%	J+	No	Yes	No	0.4	MS: 121% ; MSD: 122% ; RPD:1%.
PCB095	44007	64 - 118%	J+	No	Yes	No	0.4	MS:110%; MSD: 124% ; RPD:12%.
PCB101	44007	67 - 118%	J+	No	Yes	No	0.4	MS: 132% ; MSD: 136% ; RPD:3%.
PCB118	44007	73 - 111%	J+	No	Yes	No	0.4	MS: 115% ; MSD: 113% ; RPD:2%.
PCB119	44007	66 - 118%	J+	No	Yes	No	0.4	MS: 126% ; MSD: 129% ; RPD:2%.
PCB123	44007	73 - 120%	J+	No	Yes	No	0.4	MS: 123% ; MSD: 129% ; RPD:5%.
PCB126	43033	76 - 133%	J+	No	Yes	No	0.3405	MS: 135% ; MSD:124%; RPD:8%.
PCB126	44007	76 - 133%	J+	No	Yes	No	0.4	MS: 151% ; MSD: 149% ; RPD:1%.
PCB151	44007	70 - 116%	J+	No	Yes	No	0.4	MS:112%; MSD: 117% ; RPD:4%.
PCB153	44007	76 - 109%	J+	No	Yes	No	0.4	MS: 111% ; MSD:108%; RPD:3%.
PCB169	44007	73 - 128%	J+	No	Yes	No	0.4	MS: 151% ; MSD: 151% ; RPD:0%.
PCB189	44007	69 - 123%	J+	No	Yes	No	0.4	MS: 129% ; MSD: 124% ; RPD:4%.

Analyte (MS/MSD)	Batch	Spike Recovery Objectives	Resulting Intermediate Qualifier	One or More Spike Recoveries Below LCL?	One or More Spike Recoveries Above UCL?	Exceeds RPD Limit?	Spike Conc. ¹	Notes
Triazine								
Ametryn	44007	69 - 125%	J+	No	Yes	No	1	MS: 176% ; MSD: 191% ; RPD:8%.
Atraton	43033	71 - 136%	J+	No	Yes	No	1.7024	MS: 220% ; MSD: 249% ; RPD:12%.
Atraton	44007	71 - 136%	J+	No	Yes	No	1	MS: 264% ; MSD: 287% ; RPD:8%.
Atraton	45145	71 - 136%	J+	No	Yes	No	0.8888	MS: 140% ; MSD: 142% ; RPD:1%.
Atrazine	44007	72 - 120%	J+	No	Yes	No	1	MS: 146% ; MSD: 159% ; RPD:9%.
Cyanazine	43033	70 - 157%	J+	No	Yes	No	1.7024	MS: 241% ; MSD: 256% ; RPD:6%.
Cyanazine	44007	70 - 157%	J+	No	Yes	No	1	MS: 281% ; MSD: 294% ; RPD:5%.
Prometon	44007	73 - 125%	J+	No	Yes	No	1	MS: 171% ; MSD: 186% ; RPD:8%.
Prometon	45145	73 - 125%	J+	No	Yes	No	0.8888	MS: 129% ; MSD: 130% ; RPD:1%.
Prometryn	44007	72 - 124%	J+	No	Yes	No	1	MS: 149% ; MSD: 165% ; RPD:10%.
Propazine	44007	73 - 122%	J+	No	Yes	No	1	MS: 129% ; MSD: 145% ; RPD:12%.
Secbumeton	43033	67 - 130%	J+	No	Yes	No	1.7024	MS: 132% ; MSD: 153% ; RPD:15%.
Secbumeton	44007	67 - 130%	J+	No	Yes	No	1	MS: 235% ; MSD: 247% ; RPD:5%.
Simazine	44007	70 - 122%	J+	No	Yes	No	1	MS: 193% ; MSD: 205% ; RPD:6%.
Simetryn	43033	65 - 130%	J+	No	Yes	No	1.7024	MS: 165% ; MSD: 186% ; RPD:12%.
Simetryn	44007	65 - 130%	J+	No	Yes	No	1	MS: 266% ; MSD: 281% ; RPD:5%.
Simetryn	45145	65 - 130%	J+	No	Yes	No	0.8888	MS:129%; MSD: 131% ; RPD:2%.
Terbutryn	44007	66 - 132%	J+	No	Yes	No	1	MS: 169% ; MSD: 189% ; RPD:11%.
Terbutylazine	44007	74 - 122%	J+	No	Yes	No	1	MS: 138% ; MSD: 154% ; RPD:11%.

Bolded values are out of QC limits

1- Spike concentration is reported for the MS. MSD concentration is close to but not always equal to MS concentration

Table A-10. Long Beach Stormwater and Dry Weather Toxicity Testing QA Exceptions.

Sample Date	Experiment	Species	Sample	Description
11/26/08	811005	Water Flea and Sea Urchin	Belmont	Tested outside holding time (80 hours and 102 hours) due to laboratory loading

Table A-11. Sampling Holding Times Long Beach Stormwater and Dry Weather Samples, 2008/2009.

Date Collected	Sample Location	Hours Held Before Testing	
		Water Flea	Sea Urchin
7/3/08	Los Cerritos Channel	27	29
11/26/08	Belmont Pump	80	102
12/15/08	Belmont Pump	50	70
12/15/08	Bouton Creek	48	69
12/15/08	Los Cerritos Channel	45	65
2/6/09	Belmont Pump	23	25
2/6/09	Bouton Creek	22	24
2/6/09	Los Cerritos Channel	22	23
5/7/09	Los Cerritos Channel	27	28

Bold typeface: Test initiation exceeded 72 hour hold time.

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APPENDIX B

Los Cerritos Channel Dry Weather Copper and Bacteria Source Investigation

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